PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	SHOWA CORPORATION	)	Examiner: BURCH
Serial Number:	10/736150	)	Art Unit: 3683
Filed:	12/15/2003	)	
For:	HYDRAULIC SHOCK ABSORBING APPARATUS OF VEHICLE	)	
Docket Number:	13712	)	

STATEMENT OF THE SUBSTANCE OF THE INTERVIEW

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

25 March 2009

Sir:

This communication is responsive to your Interview Summary dated 25 February 2009, describing an Interview conducted on 20 February 2009, having a shortened statutory period for reply set to expire 25 March 2009. Accordingly, this response is timely filed on 25 March 2009.

Please see the attached comments regarding the Interview.

STATEMENT OF THE SUBSTANCE OF THE INTERVIEW

The Examiner states in the Interview Summary that the Fig. 2 check valve 44 would provide some level of damping during expansion as a fluid passes by the valve 44 which is spring biased closed due to the presence of element 44b. This understanding by the Examiner is contrary to all of the written disclosure in this application, including the original Specification.

Fig. 2 illustrates the shock absorber which is arranged to provide damping during the compression stroke. Following is a general description of the operation of a shock absorber, and in particular the operation of this shock absorber which is designed to damp only during the compression stroke.

Normally a shock absorber has one portion fixedly attached to a frame of a vehicle, and the other movable section attached to a wheel assembly. There is normally also an external spring which works in conjunction with the shock absorber. For example, when a vehicle hits a bump in the road, an external force acts upon the wheel which compresses the spring and the shock absorber at that moment. During the compression of the shock absorber, the piston/rod assembly moves in the downward direction as shown in Fig. 2. The external force drives the piston and rod assembly down which immediately increases abruptly the pressure below the piston assembly, owing to the fact that hydraulic fluid is largely incompressible. This abrupt pressure change acts upon the check valve 44 to immediately close it. This is repeatedly set out in the Specification, where it is stated that the check valve of this shock absorber is closed during compression and open during expansion. There is no disclosure of any throttling function or gradual closing of the check valve. It is according to our Specification either open or closed. In fact, when the pressure on the

lower surface of the check valve is higher than the pressure on the upper surface of the check valve, the check valve immediately moves up and closes. At that moment, no fluid can pass through the check valve, and all fluid is forced through the compression side passage and is throttled controllably by the compression side damping valve 43. Meanwhile, the piston/rod assembly of the corresponding other shock absorber which is designed to operate in the opposite manner, is moving in the same direction, but is not performing any intentional or desired damping, because fluid is moving freely through the open check valve in that shock absorber during the moments that the check valve is correspondingly closed in the compression shock absorber.

When the external force is removed (the vehicle has moved beyond the bump), the suspension spring urges the wheel to return to its rest position, expanding both shock absorbers immediately upon removal of the particular external force from the bump. This change happens very abruptly. The instant that the direction of force is changed on the piston rod assemblies, the check valve in the compression shock absorber immediately opens completely, while the check valve in the corresponding shock absorber immediately closes completely.

The valve spring 44b referred to by the Examiner is not an active spring which biases the movement of the check valve during operation. It is a back-up structure as stated in the description. It is not balancing the check valve against pressure forces. Our check valve is free to and is intended to slide wide open immediately when the pressure forces change direction due to the change in direction of the external force.

When the piston/rod of Fig. 2 changes direction and moves up, the check valve immediately opens, allowing the fluid to freely flow into the region below the piston.

It is desired that the fluid flow back into the region below the piston as rapidly as possible, to allow the piston/rod assembly to move up, to be ready to move back down in a repeated manner, to prepare for its next working cycle of damping during compression. The invention is designed to allow the piston/road assembly to "cock" back to a ready-to-work position as quickly as possible in the absence of unintended frictional effects. This quick cocking back to the ready position is a desirable characteristic leading to higher performance and sensitivity of the shock absorber in the one shock absorber, and vice-versa for the other shock absorber.

It is stated numerous times in the original Specification that the check valve is open during expansion and closed during compression. There is no disclosure of the check valve being capable of doing anything other than simply opening and closing according to the function of a normal check valve. "Opening" means fully open, and "closing" means fully closed.

In the embodiment illustrated in Fig. 2, the check valve is a rigid doughnut-shaped valve which moves full open when the pressure is higher on the top surface than on the bottom surface, and full closed when the pressure is higher on the bottom surface than on the top surface.

The foregoing description does not limit the claimed invention in any way beyond the appropriate limitations according to the claim language, and is provided here only to help clarify the function of shock absorbers in general, and particular features of the shock absorber as disclosed and claimed.

Respectfully submitted,

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